Models 8240/8260 AEROTRAK™ Portable Optical Particle Counters

Operation and Service Manual

1980544, Revision A
September 2006

TSI®

Models 8240/8260
AEROTRAK™ Portable
Optical Particle Counters

Operation and Service Manual

1980544, Revision A
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Buyer and all users are deemed to have accepted this LIMITATION OF WARRANTY AND LIABILITY, which contains the complete and exclusive limited warranty of Seller. This LIMITATION OF WARRANTY AND LIABILITY may not be amended, modified or its terms waived, except by writing signed by an Officer of Seller.

Service Policy
Knowing that inoperative or defective instruments are as detrimental to TSI as they are to our customers, our service policy is designed to give prompt attention to any problems. If any malfunction is discovered, please contact your nearest sales office or representative, or call TSI at (800) 874-2811 (USA) or (001 651) 490-2811 (International).

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Application Notes can be found at TSI's web site:
http://www.tsi.com

Safety Information

IMPORTANT
There are no user serviceable parts inside the instrument. Refer all repair and maintenance to a qualified factory-authorized technician. All maintenance and repair information in this manual is included for use by a qualified factory-authorized technician.

Laser Safety

- The Model 8240 and 8260 Optical Particle Counters are Class I laser-based instruments
- During normal operation, you will ***not*** be exposed to laser radiation
- Precaution should be taken to avoid exposure to hazardous radiation in the form of intense, focused, visible light
- Exposure to this light may cause blindness

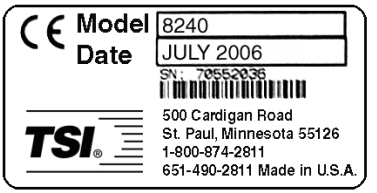
Take these precautions:

- ***DO NOT*** remove any parts from the OPC unless you are specifically told to do so in this manual
- ***DO NOT*** remove the housing or covers. There are no serviceable components inside the housing

WARNING
The use of controls, adjustments, or procedures other than those specified in this manual may result in exposure to hazardous optical radiation.

Labels

Advisory labels and identification labels are attached to the outside of the OPC housing and to the optics housing on the inside of the instrument.

1. Serial Number Label (*back panel*)	
2. Laser Radiation Label (*internal*)	**DANGER** **LASER RADIATION WHEN OPEN AVIOD DIRECT EXPOSURE TO BEAM**
3. Electrical Shock caution and no user serviceable parts (*back panel*)	**CAUTION** No user serviceable parts inside. Refer service to qualified personnel. To avoid electrical shock, the power cord protective grounding conductor must be connected to earth ground
4. Laser Instrument compliance label (*back panel*)	**Class 1 Laser Product** This product is in complete compliance with 21 CFR 1040, 10 and 1040, 11
5. AC Power Label (*back panel*)	AC Power In 100-240 VAC 50-60 Hz, 1.0A Max
6. European symbol for non-disposable item. Item must be recycled. (*back panel*)	

Description of Caution/Warning Symbols

Appropriate caution/warning statements are used throughout the manual and on the instrument that require you to take cautionary measures when working with the instrument.

Caution

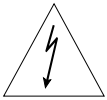
Caution
Failure to follow the procedures prescribed in this manual might result in irreparable equipment damage. Important information about the operation and maintenance of this instrument is included in this manual.

Warning

WARNING
Warning means that unsafe use of the instrument could result in serious injury to you or cause damage to the instrument. Follow the procedures prescribed.

Caution and Warning Symbols

The following symbols may accompany cautions and warnings to indicate the nature and consequences of hazards:

	Warns that uninsulated voltages within the instrument may have sufficient magnitude to cause electrical shock.
	Warns that the instrument contains a laser and that important information about its safe operation and maintenance is included in the manual.
	Warns that the instrument is susceptible to electro-static discharge (ESD) and ESD protection should be followed to avoid damage.
	Indicates the connector is connected to earth ground and cabinet ground.

Chapter 1

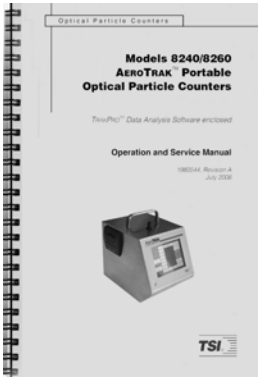
Unpacking and Parts Identification

Unpacking the AEROTRAK Portable Optical Particle Counter

Carefully unpack the AEROTRAK Optical Particle Counter from the shipping container.

Model 8240 AEROTRAK Optical Particle Counter

Qty.	Item Description	Part/Model	Ref.
1	AEROTRAK Optical Particle Counter	8240 or 8260	1
1	AC power cord	1303053	2
1	Rechargeable lithium ion battery	1208057	3
1	Isokinetic probe, Model 8240/8260	1300085 or 1300086	4
2	Stylus	N/A	5
1	Carrying case	1310061	6
1	Computer cable, USB	1303740	7
2	HEPA zero filter, with adapter	1300088	8



1

2

3

Service Manual, Certificate, and TRAKPRO Software

Qty.	Item Description	Part/Model	Ref.
1	Operation and Service Manual	1980380	1
1	Calibration Certificate	N/A	2
1	TRAKPRO Software	1090014	3

Optional Accessories

Accessories

Item Description	Part/Model	Ref.
External battery charger with AC adapter and power cord	2610114	1
Rechargeable lithium ion battery	1208057	2
Air velocity probe	8592	3
Temperature/humidity probe	1300102	4
Tripod for the isokinetic probe	3000192	5

Spare/Replacement Parts

The following items may be purchased as spare or replacement parts.

Qty.	Item Description	Part/Model
5 rolls	Thermal paper for integral printer	2608011
1	Fuse - 250V, 1 AMP, TYPE "T", 5 mm x 20 mm	1605077

Chapter 2

Set Up

Supplying Power to the AEROTRAK™ Optical Particle Counter

Installing the Battery

The Model 8240 or 8260 AEROTRAK Optical Particle Counter (OPC) may be powered in two ways:

- Rechargeable lithium-ion battery
- AC power cord

Installing the Battery

To install the battery:

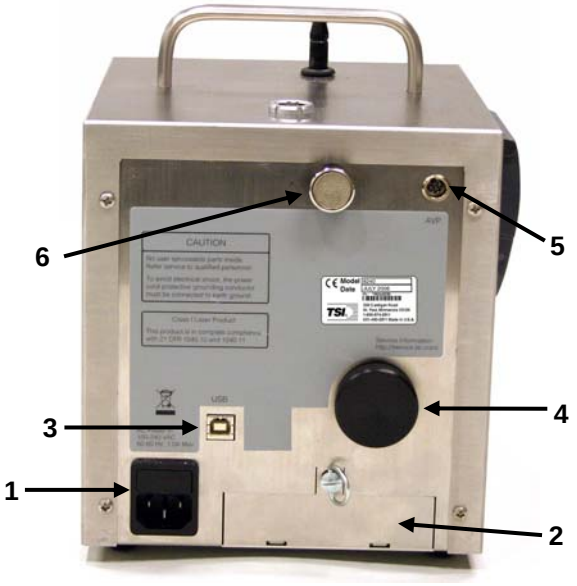
1. Remove the battery door on the back of the instrument by turning the thumbscrew ¼ turn counterclockwise
2. Slide the battery into the slot, pressing until it clicks into place
3. Close the battery door and lock the thumbscrew with a ¼ turn clockwise

WARNING
The battery supplied by TSI (PN 1208057) has built in protection against explosion and fire hazard. Do ***not*** use a substitute.

WARNING
Do ***not*** use non-rechargeable batteries in this instrument. Fire, explosions, or other hazards may result.

Using AC Power

- When using the AC power, the battery (if installed) charges while the instrument is on, but not while actively sampling
- The AEROTRAK Optical Particle Counter has an internal, non-user accessible battery to maintain settings and save logged data
- Removing/changing the lithium-ion battery or disconnecting AC power does not cause the loss of data
- TSI will install a new internal battery as part of routine service, as necessary



Back Panel

1. AC socket	**4**. Exhaust
2. Battery access cover	**5**. Air velocity probe port
3. USB Port	**6** Flow compensation temperature sensor

Daily Zero Check

A zero check should be performed at least once a day and before conducting any important testing or certification.

Attaching Zero Filter Assembly

1. Turn on the instrument and wait until the main menu is displayed
2. Remove the Isokinetic probe if attached
3. Attach the supplied zero filter assembly consisting of two filter cassettes and an adapter to the inlet nozzle located on the top of the instrument
4. Allow the instrument to purge for 2 minutes
5. After the purge cycle, continue to sample. In accordance with JIS standards, there should be no more than 1 particle counted at any size in 5 minutes
6. Remove the zero filter assembly; the instrument is now ready for operation

Notes:

1 If the instrument does not go to zero, refer to Chapter 6, Troubleshooting, for additional information.

2. The daily zero check cannot be performed when the isokinetic probe is attached to the instrument.

Integral Thermal Printer

- A hard copy of a sample set, statistics or an ISO test can be printed from the instrument
- The AEROTRAK OPC is equipped with an automatic print feature to print automatically after each test is completed that can be enabled under the "Settings" menu
- Printer paper has a colored strip printed on the last few feet of each roll to indicate time to change the paper roll
- When installing a new roll of paper, the tag end should be from the bottom of the roll and pulled through the printer door

Integral Thermal Printer

Using the Isokinetic Probe

The Isokinetic probe smoothly accelerates air into the inlet of the instrument. The inlet diameter of the conical shaped probe is matched to the 90 ft/min flow rate, ±20%, which is typical for many HEPA filters.

Sampling with Isokinetic Probe Assembly

Optional Adjustable Tripod Mount

- The probe is pushed onto the inlet nozzle *or*
- Can be used with an optional adjustable tripod mount if air is moving in a direction other than straight down

Optional Temperature/Relative Humidity Probe

To install the optional temperature/relative humidity probe:

- Align the small red dot at the base of the probe to the front of the OPC
- Press the probe into the socket until it clicks
- Temperature and relative humidity automatically display
- The probe can be removed by lifting it straight up

Temperature/Relative Humidity Probe

Optional Air Velocity Probe

To install the optional air velocity probe:

- Orient the black detent button in the up position
- Press firmly into the socket until it clicks
- To remove the probe, depress the black detent button and pull the plug straight back

Air Velocity Probe

Options

- User selectable units of measure in ft/min, ft/s, m/min or m/s
- A running average value may also be selected between 1 and 10 seconds

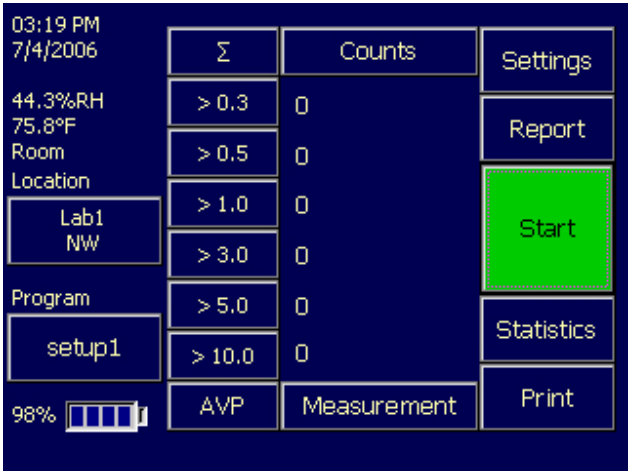
Chapter 3

Operation

- Press and hold the ON/OFF switch (located in the lower left of the front of the instrument) for a few seconds to turn on the AEROTRAK OPC
- A brief start-up sequence which takes about 15 seconds, begins
- A splash screen displays a TSI logo
- When the main menu appears, the instrument is ready for operation
- The unit is equipped with a small green LED above the ON/OFF switch to indicate that the unit is on
- As a power saving measure, after 15 minutes, the backlight turns off. A touch to the screen re-activates the backlight.

Main Menu

The AEROTRAK Optical Particle Counter is controlled using a touch screen display. Use a plastic stylus or finger tip. **DO NOT** use sharp objects that may damage the screen overlay.

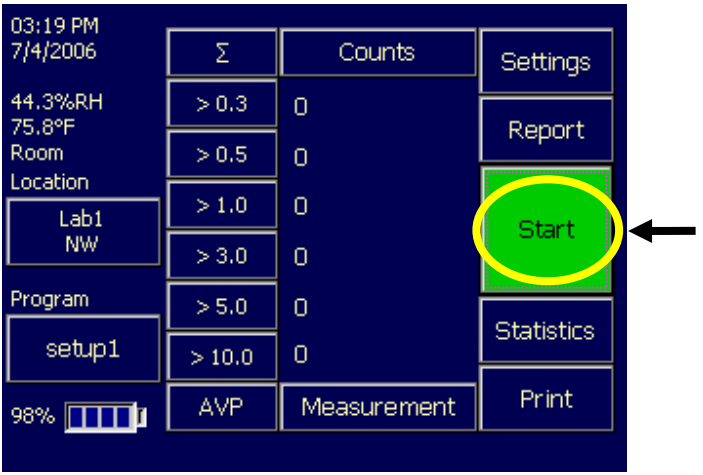


Main Menu

Screen Layout and Functionality

The following explains the functions of the various touch screen commands.

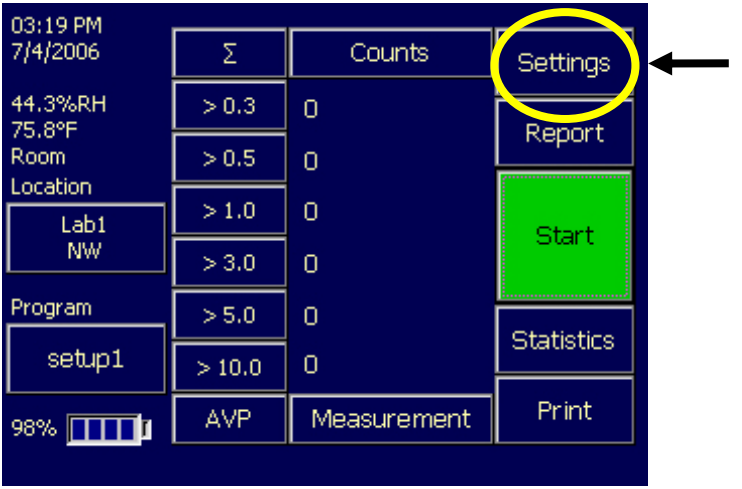
Start/Stop

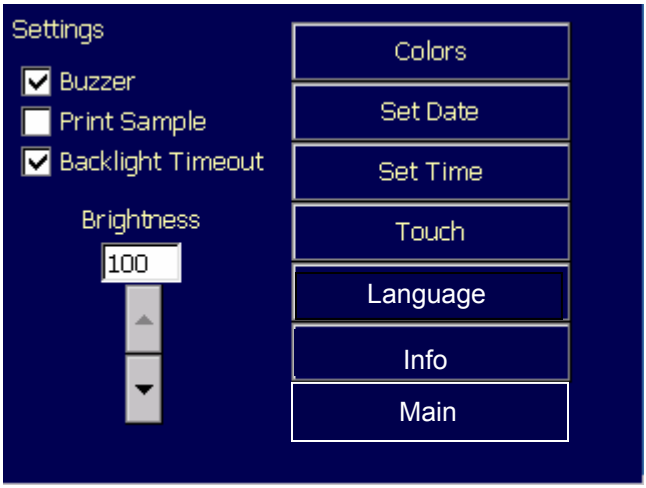


- **Start**—(green background) begin a sample test
- **Stop**—(red background) end a sample test

  Note: *Data will not be saved if a test is interrupted*

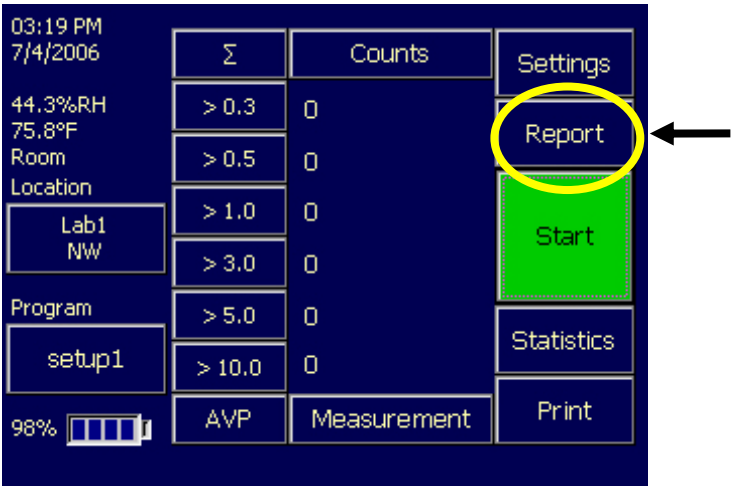
Settings



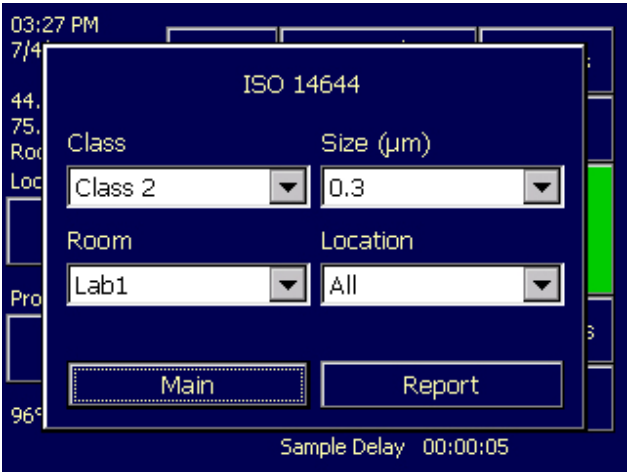


- **Colors**—screen colors: selectable for background, buttons and text
- **Set Date**—date should be entered as MM/DD/YYYY using a pop-up keypad (not shown) and selecting the MM/DD/YYYY or DD/MM/YYYY format
- **Set Time**—pop-up keypad (not shown) for setting the time format to AM/PM or 24 hour
- **Touch calibration—**set screen touch locations
- **Language—**select language on the display
- **Information—**unit serial number, model number, firmware version, and the last calibration date
- **Brightness—**user adjustable from 0 to 100
- **Main—**return to the Main Menu

Reporting



ISO 14644 Reporting Options

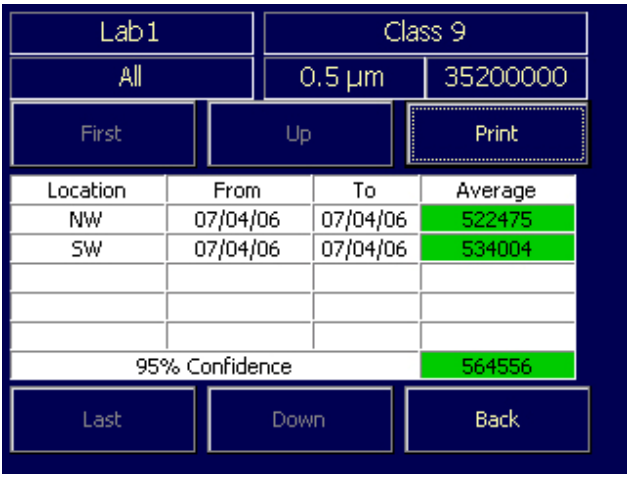


- **Class—**select ISO class of cleanliness from 2 to 9
- **Size (µm)—**select particle size selected. ISO 14644-1 specifies sizes of 0.1, 0.2, 0.3, 0.5, 1.0, and 5.0 microns

  Note: *If bins are adjusted to sizes other than those listed in ISO 14644-1, the ISO reporting feature is not available*
- **Room—**select a room
- **Location**—select a location within a room

- **Report—**display a report based on ISO 14644-1 and the criteria selected
- **Main—**return to the Main Menu

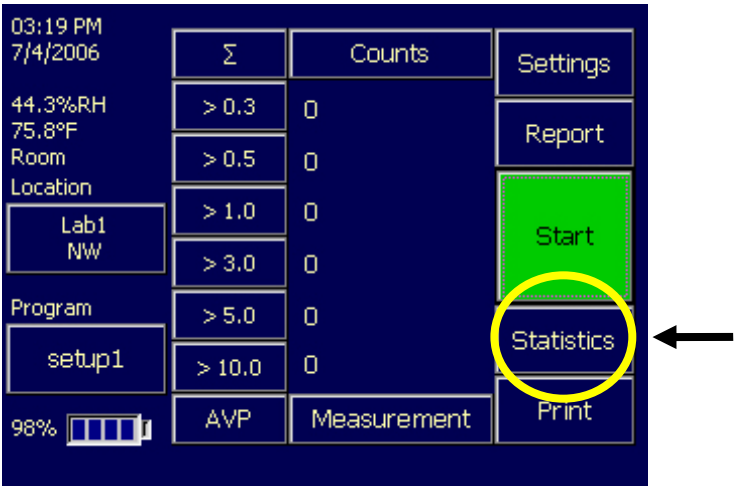
ISO Report Format



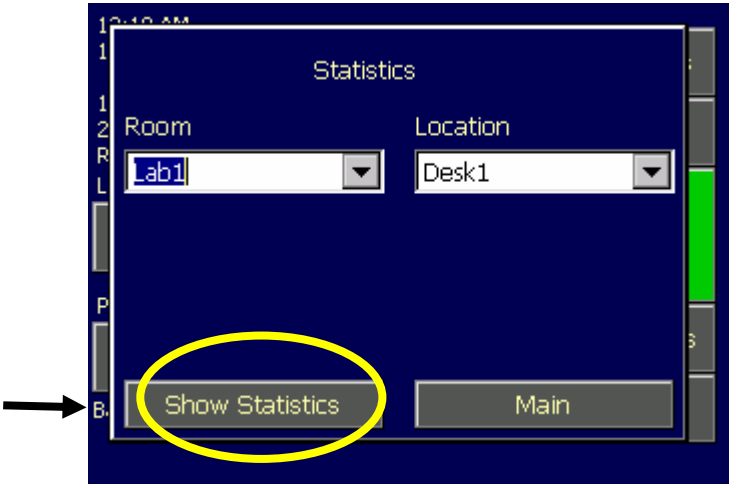
Information shown at the top of this screen includes data selected on the report screen including room, ISO class, locations selected, particle size channel selected and the count limit for the parameters selected

- **First**—go to the first saved test
- **Up**—go to the next saved test
- **Print**—print the test displayed
- **Last**—go to the last test saved
- **Down**—go to the previous test saved
- **Back**—return to the test set-up screen

Statistics

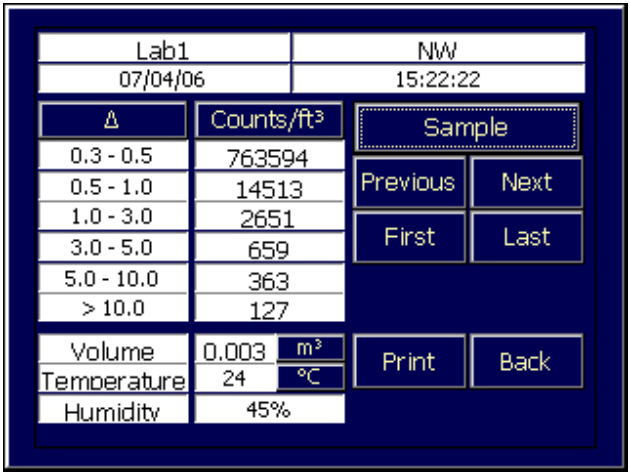


Statistics Set-up Screen



- **Room**—select a room from a drop down menu
- **Location**—select a location
- **Show Statistics**—display summary information
- **Main**—return to the Main Menu

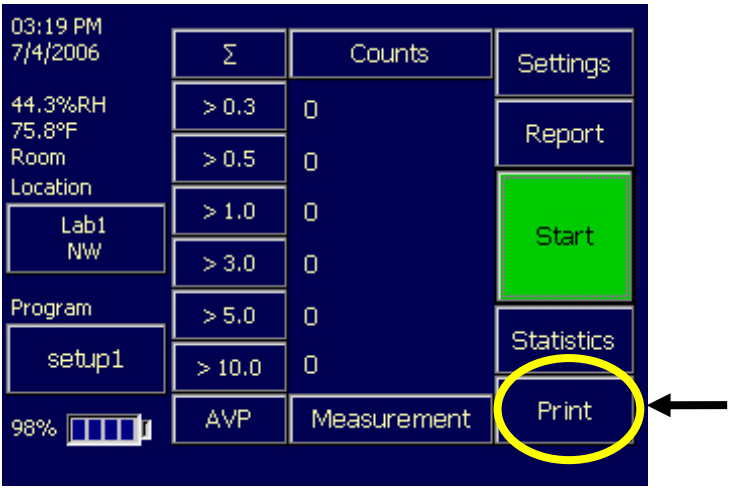
Show Statistics



Information at the top of the screen shows data selected on the statistics set-up screen including room, location selected, date and time.

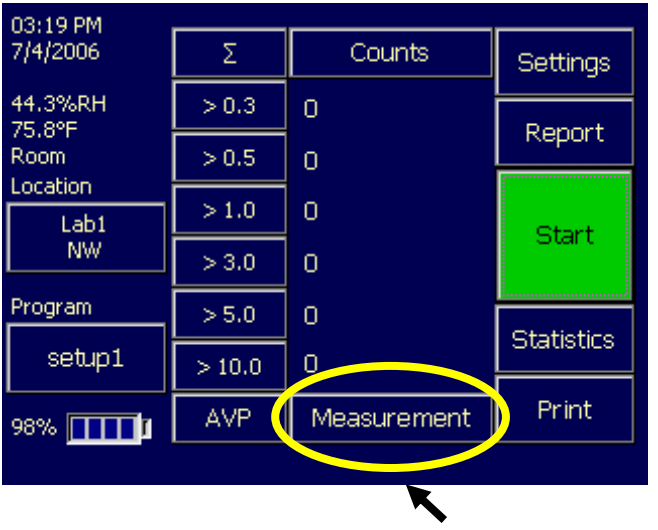
- **Count mode**—toggle between summary (Σ) or differential (Δ) count
- **Counts**—toggle between actual count, count/ft^3 or count/m^3
- **Sample**—toggle between individual sample or an average of samples
- **Previous**—go to the previously saved test
- **Next**—go to the next saved test
- **First**—go to the first saved test
- **Last**—go to the last test saved
- **Print**—print the information displayed
- **Back**—return to the statistics set-up screen

Print

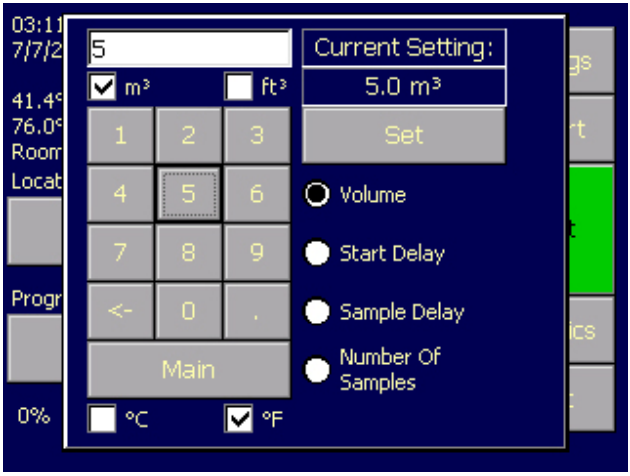


- **Print**—print the information displayed

Measurement

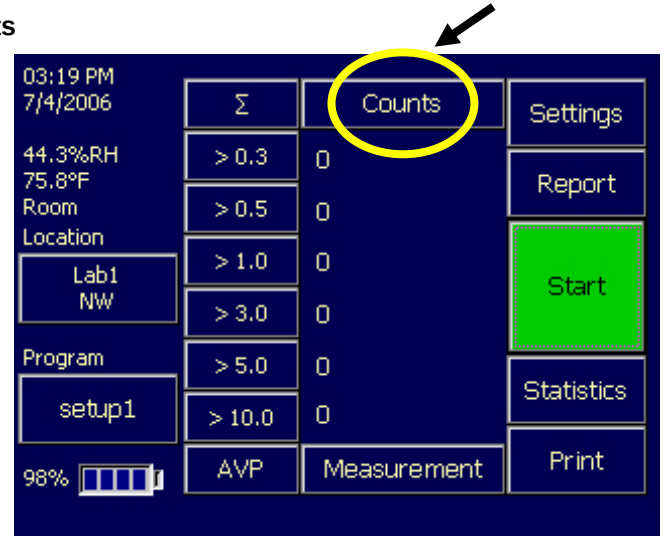


Measurement



- **Volume**—set amount of air sampled in ft^3 or m^3
- **Start Delay**—set time before test sample begins from 10 seconds to 24 hours
- **Sample Delay**—set time between multiple tests from 10 seconds to 24 hours
- **Number of Samples**—set number of tests to be repeated with the same parameters up to 999 tests
- **Temperature**—select between °F or °C
- **Set**—save the parameters selected
- **Main**—return to the Main Menu

Counts

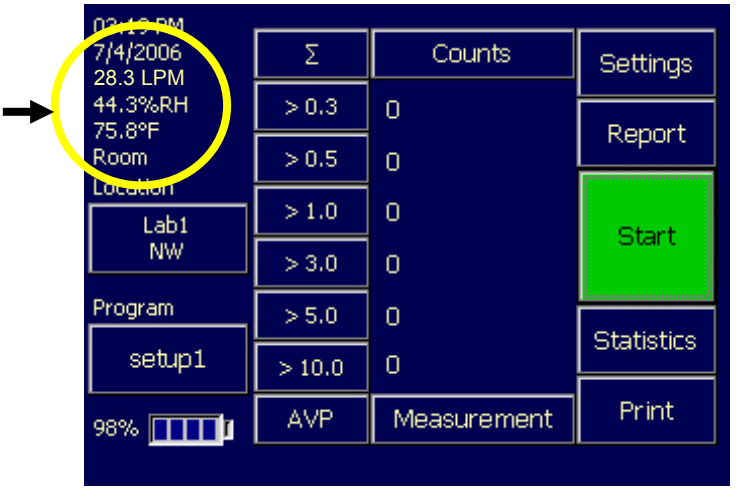


- Counts is a toggle key to show units between:
  - Actual number count for a given time or volume sample or
  - Counts/ft^3 (projected if volume sampled is less than 1 cubic foot) or
  - Counts/m^3 (projected if volume sampled is less than 1 cubic meter)

Count Mode

- **Count Mode**—a toggle key to select between:
  - Total or summary count mode (Σ) appears as ">0.3 µm" and all particles 0.3 µm and greater are counted and displayed in that channel or bin
  - Differential count mode (Δ) appears as "0.3–0.5 µm" and only particles between 0.3 and 0.5 µm are counted and displayed

Conditions



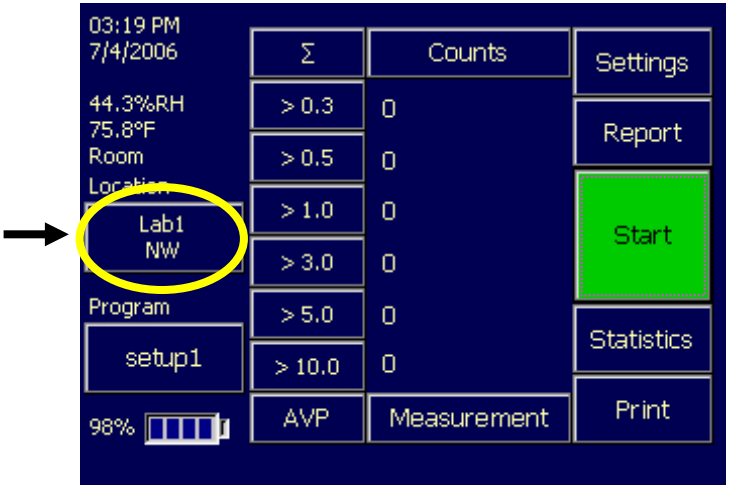
Time—user selectable format in "Settings"

Date—user selectable format in "Settings"

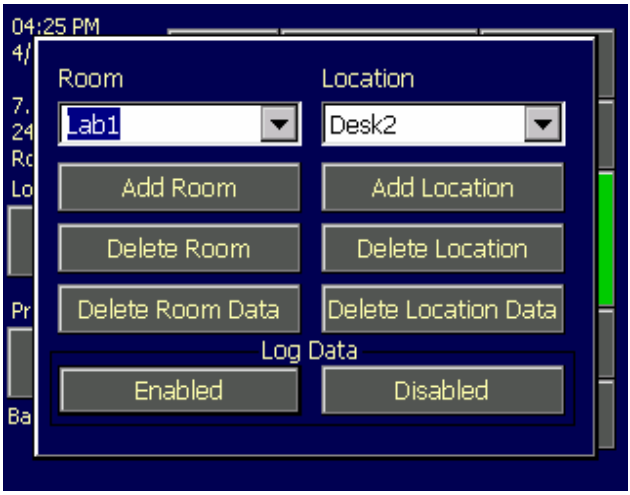
Flow rate—Shows the actual flow rate of the sample during a test; the average flow rate of the sample is saved

Temperature/humidity—displayed when the optional probe is attached

Location Identification



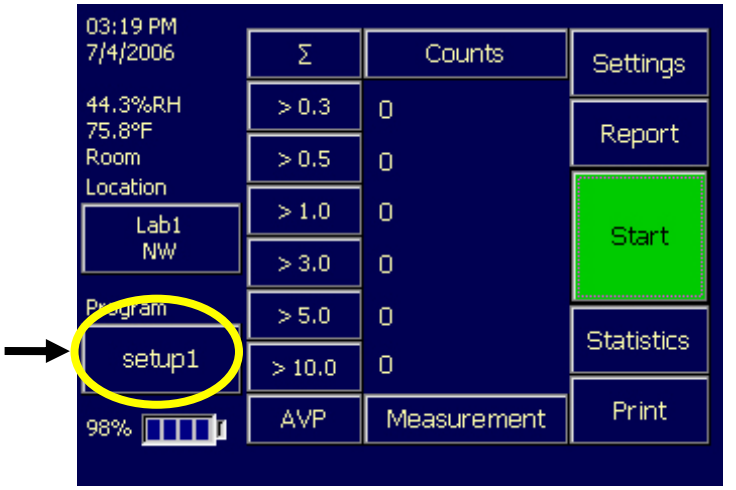
Location Identification to Save Data



- **Add Room**—name a room using a pop-up keypad (not shown), eight-character limit
- **Add Location**—name a specific location within a room using the pop-up keypad, eight-character limit

  IMPORTANT: *To save a data set, a room and location must be selected either from memory or created*
- **Delete Room**—remove the room name from memory
- **Delete Location**—remove the location name from memory
- **Delete Room Data**—remove the data set from a selected room name from memory
- **Delete Location Data**—remove the data set from a selected location name from memory
- **Enabled**—sets the room and location information shown as the location where sample data is logged and saved
- **Disabled**—turn the room and location information off, no data will be saved

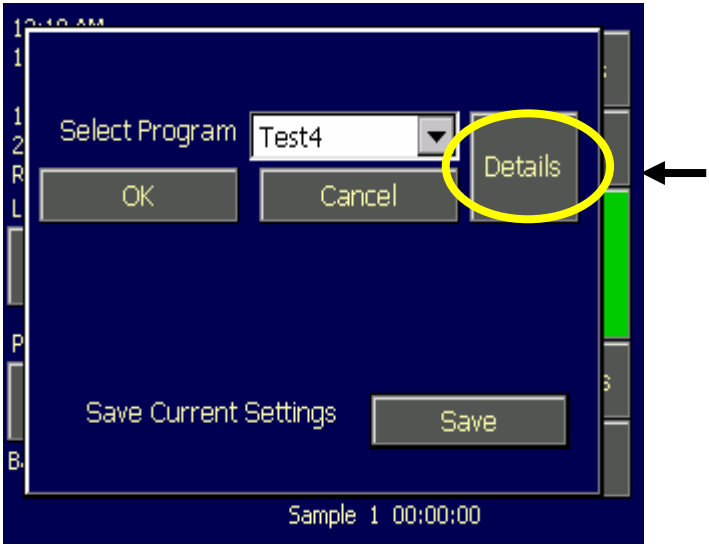
Program



Setting Test Criteria

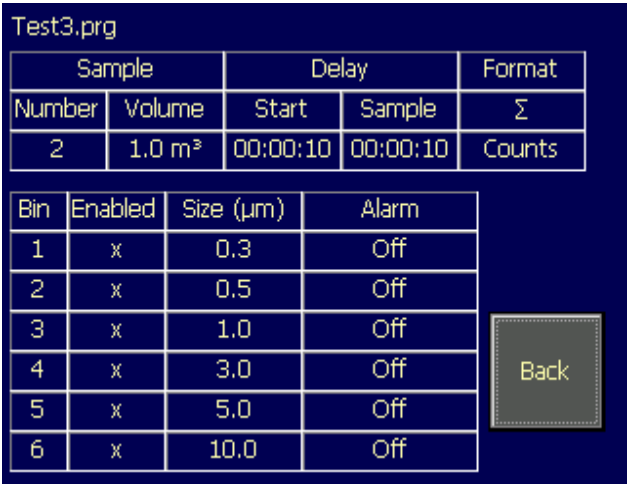
- The initial Program screen allows the selection of previously saved test criteria using a drop-down menu
- Test criteria can be created on the screen using other keys such as:
  - Number of samples
  - Sample volume
  - Start and sample delays
  - Count format
  - Bins on/off, size selected, alarm on/off and alarm set points
- This information can now be named and saved using a pop-up keyboard screen (not shown)

Select Program



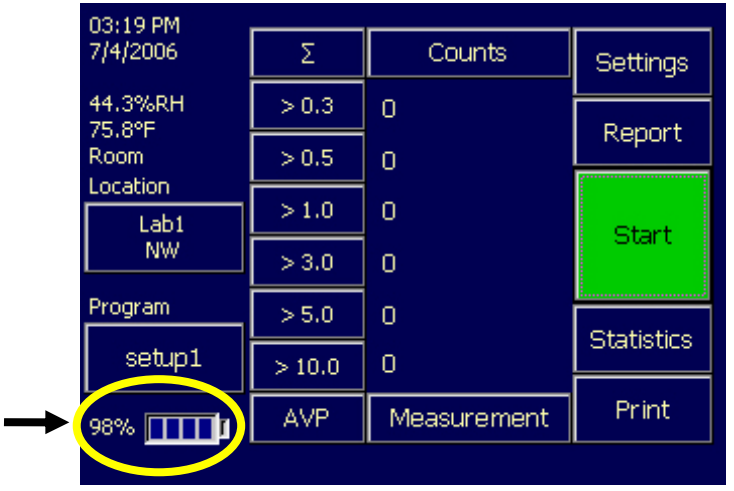
- **Select Program**—a drop-down menu appears and a previously saved test program can be selected
- **OK**—enables the selected test program using saved criteria
- **Cancel**—disable the program
- **Save**—allow criteria selected from the main menu to be saved for future reference. A pop-up keyboard (not shown) allows naming the test program

Details



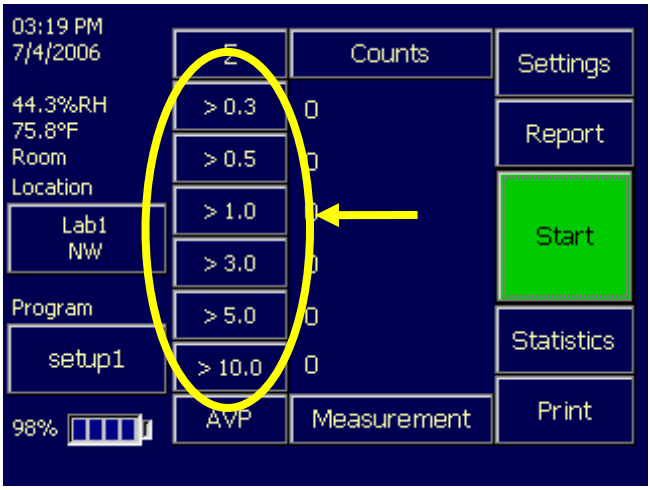
This screen shows criteria selected for a given test or program.

Battery

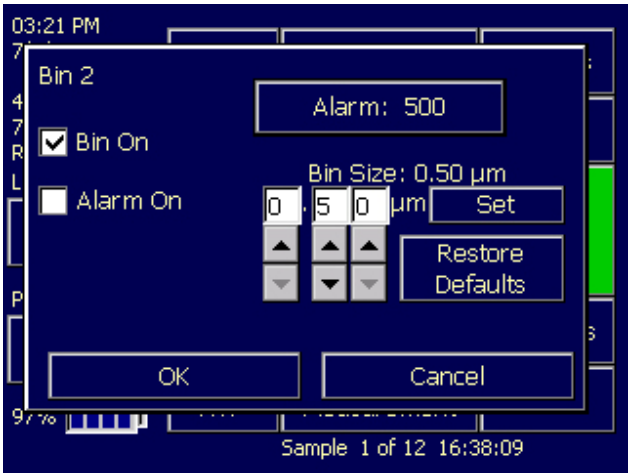


Battery indicator—shows remaining charge expressed as %

Bin or Channel Characteristics



Example—Bin 2



- **Bin ON/OFF**—determine which bins are displayed; data for all six bins is collected and saved
- **Alarm ON/OFF**—user selectable for one or more bin sizes
- **Alarm limits**—can be set on the numeric pop-up screen (not shown)
- **Adjusting bin sizes**—use the up/down arrows to change bin size ranges in 0.01 micron increments
  - Size selected determines the lower limit of a given channel or bin
  - Sizes selected **may not overlap or cross into another channel or bin size**

- Cannot go below 0.3 microns or above 10 microns
- Whatever value is selected for Bin 6 will count particles at that size and larger. *It is recommended that channel sizes be selected from smallest to largest.*

- **Example—**Changing bin lower limits to 0.4, 0.6, 2.0, 3.5, 6.0 and 9.0 would result in:

Differential Counts	Summary Counts
0.4–0.6	>0.4
0.6–2.0	>0.6
2.0–3.5	>2.0
3.5–6.0	>3.5
6.0–9.0	>6.0
>9.0	>9.0

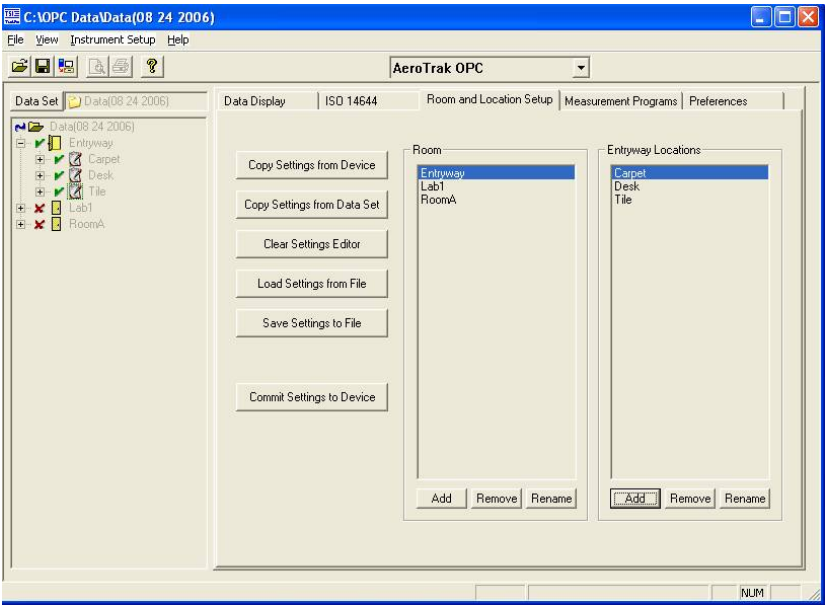
- **Set—**retain settings selected
- **Restore Defaults—**return to factory settings of 0.3, 0.5, 1.0, 3.0, 5.0 and 10 microns in optical diameter

Chapter 4

Communication

Setting Parameters using TRAKPRO Software

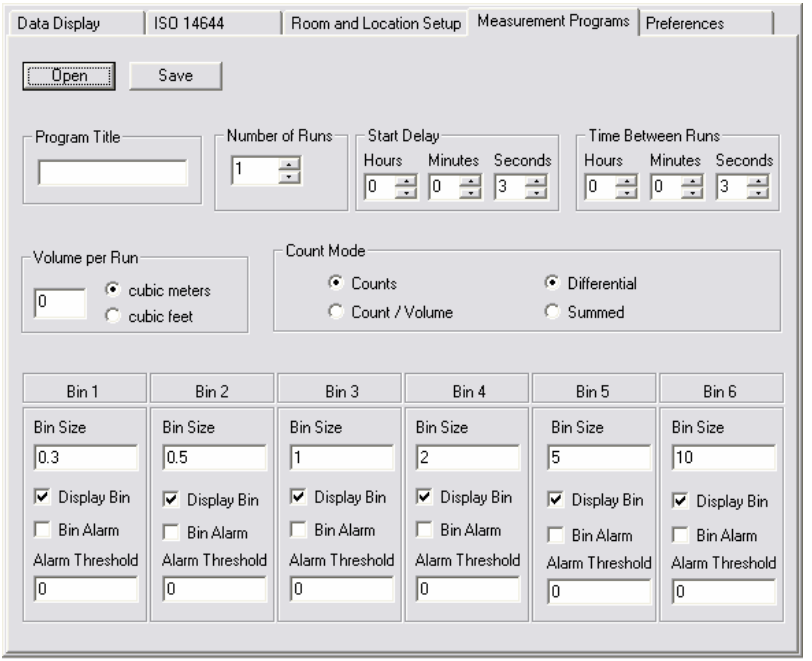
Room and Location Setup



Room and Location Setup

- Settings for rooms and locations can be created or edited, then saved to the computer or uploaded to the instrument
- There is an eight-character limit for room and location names

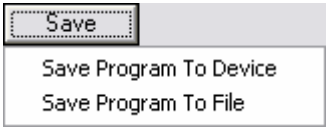
Measurement Programs



Measurement Programs

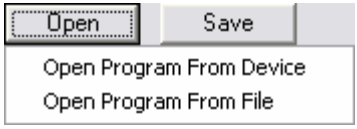
- Program for sampling criteria can be created or edited and then saved or uploaded to the OPC
- There is an eight-character limit for program names
- Number of test samples with identical criteria to be run consecutively from 1 to 999
- Start delay and time between samples can be set from 10 seconds to 24 hours
- Bin size may be adjusted between 0.3 and 10.0 microns in 0.01 increments. Bin size selected determines the lower limit of a given channel or bin and affects the adjacent bin. Bin sizes **may not overlap or cross into another channel or bin size**. The value selected for Bin 6 or the largest bin will count particles at that size and larger.

Saving Programs



- A program can be saved internally to the AEROTRAK OPC or to a file on a computer via the USB connection for future reference

Opening Program

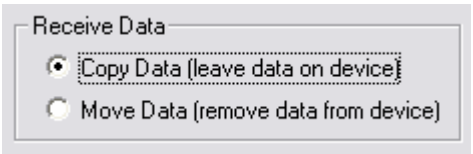


- A program can be opened from those saved in the AEROTRAK OPC or from a saved file on a computer via the USB connection and loaded into the program settings editor

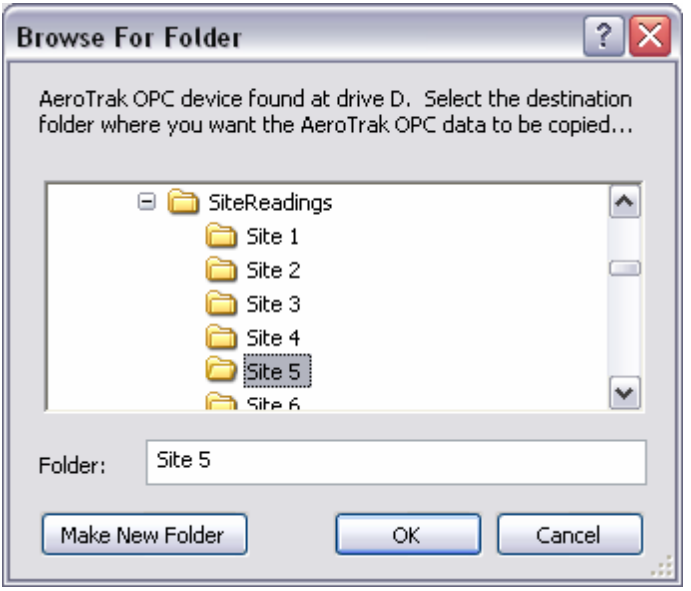
Downloading Data Using TRAKPRO Software

Use TRAKPRO to transfer data from an instrument to a computer via the USB connection for further analysis and report generation.

Copy/Move Data



- Choose either **Copy Data** or **Move Data** under the **Preferences** tab
- To begin data transfer, select **Receive** from the **File** menu or press the receive button on the menu bar. If TRAKPRO finds an attached AEROTRAK OPC instrument, a dialog appears prompting you to select the folder to save the data



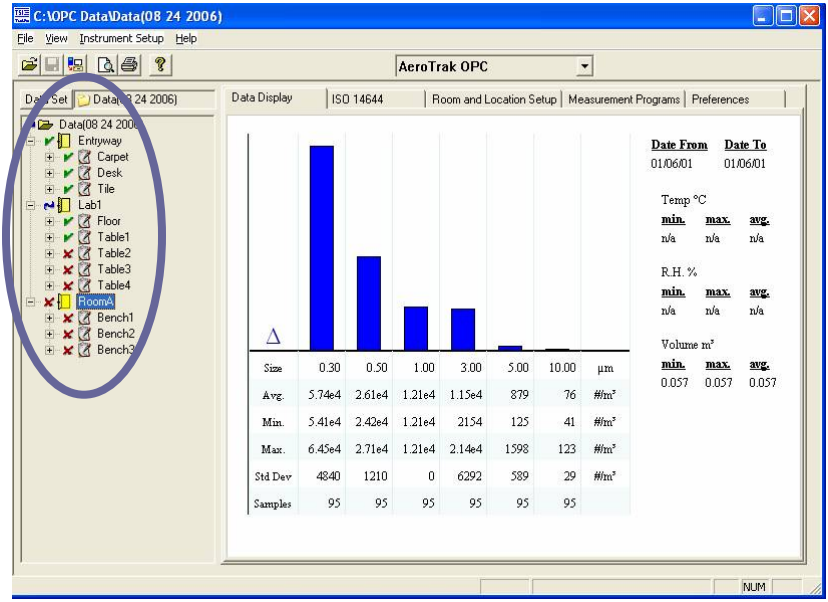
- To cancel the data transfer, select **Cancel**
- To accept data transfer, select **OK**
- The data folder is named "Data – *Date and Time*", the date and time will be the time at which the data transfer occurred expressed in Coordinated Universal Time (UTC), not local time
- After transfer, the data set opens

Opening Saved Data

1. Select **Open** from the **File** menu or Press on the menu bar or

    - An open data browser appears and the desired data set can be selected

Data Selection

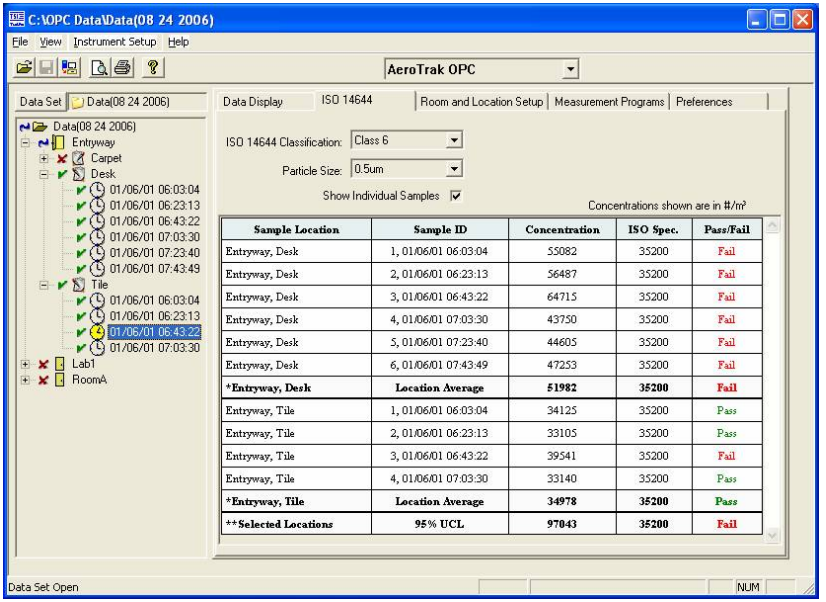


- Use the data tree to select the samples to include in the display or calculation
- Selected sets or individual samples have a green ✔ next to them
- Files that are not selected have a red ✘ next to them
- Within a set, if some samples are selected and others not, a blue ↵ appears

Data Display

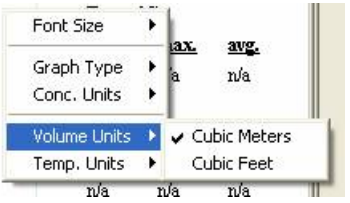
- When samples have been selected, information appears in the Data Display window. Select the **Data Display** tab
- To choose between a summed or differential histogram, right-click on the data display and select **Graph Type**
- When the differential graph type is selected, each bin size value represents the lower size boundary for that bin and the width of the bin is determined by the lower boundary of the next larger bin. For example, the 0.3 µm bin contains particles from 0.3 µm up to 0.5 µm; the 0.5 µm bin contains data for particles from 05 µm up to 1.0 µm, etc.
- When the summed graph type is selected, each bin size value represents the lower boundary and all larger particles

- The Data Table shows a summary for the selected data. The table has six rows: size, average, minimum, maximum, standard deviation, and samples
- The units for the average, minimum, maximum, and standard deviation can be expressed as #/cm^3, #/m^3, #/ft^3 the total count for a given sample volume

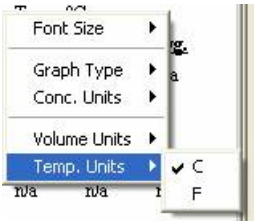


Sample Location	Sample ID	Concentration	ISO Spec.	Pass/Fail
Entryway, Desk	1, 01/06/01 06:03:04	55082	35200	Fail
Entryway, Desk	2, 01/06/01 06:23:13	56487	35200	Fail
Entryway, Desk	3, 01/06/01 06:43:22	64715	35200	Fail
Entryway, Desk	4, 01/06/01 07:03:30	43750	35200	Fail
Entryway, Desk	5, 01/06/01 07:23:40	44605	35200	Fail
Entryway, Desk	6, 01/06/01 07:43:49	47253	35200	Fail
*Entryway, Desk	Location Average	51982	35200	Fail
Entryway, Tile	1, 01/06/01 06:03:04	34125	35200	Pass
Entryway, Tile	2, 01/06/01 06:23:13	33105	35200	Pass
Entryway, Tile	3, 01/06/01 06:43:22	39541	35200	Fail
Entryway, Tile	4, 01/06/01 07:03:30	33140	35200	Pass
*Entryway, Tile	Location Average	34978	35200	Pass
**Selected Locations	95% UCL	97043	35200	Fail

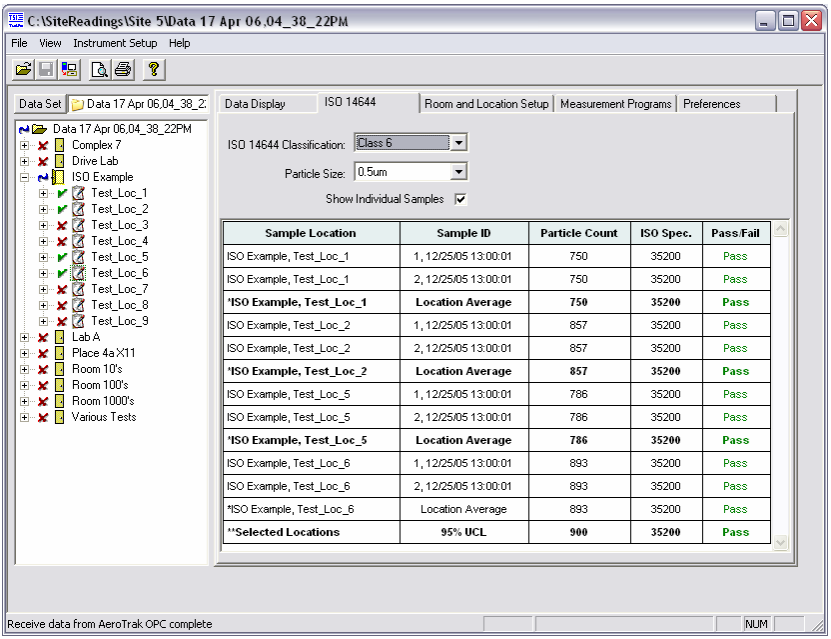
- To change the units, right-click on the Data Display and select the desired units from the **Conc. Units** submenu.
- The final section of the Data Display contains measurement details, a summary of the test conditions including date and volume statistics. Temperature and humidity statistics are also shown if the optional temperature/humidity probe is used
- To change the volume units, right-click on the Data Display, select **Volume Units**, and then choose the desired units



- To change the temperature units, right-click on the Data Display, select **Temp. Units**



Reporting ISO 14644 Conformance Testing



Sample Location	Sample ID	Particle Count	ISO Spec.	Pass/Fail
ISO Example, Test_Loc_1	1, 12/25/05 13:00:01	750	35200	Pass
ISO Example, Test_Loc_1	2, 12/25/05 13:00:01	750	35200	Pass
'ISO Example, Test_Loc_1	**Location Average**	**750**	**35200**	**Pass**
ISO Example, Test_Loc_2	1, 12/25/05 13:00:01	857	35200	Pass
ISO Example, Test_Loc_2	2, 12/25/05 13:00:01	857	35200	Pass
'ISO Example, Test_Loc_2	**Location Average**	**857**	**35200**	**Pass**
ISO Example, Test_Loc_5	1, 12/25/05 13:00:01	786	35200	Pass
ISO Example, Test_Loc_5	2, 12/25/05 13:00:01	786	35200	Pass
'ISO Example, Test_Loc_5	**Location Average**	**786**	**35200**	**Pass**
ISO Example, Test_Loc_6	1, 12/25/05 13:00:01	893	35200	Pass
ISO Example, Test_Loc_6	2, 12/25/05 13:00:01	893	35200	Pass
*ISO Example, Test_Loc_6	Location Average	893	35200	Pass
'Selected Locations	**95% UCL**	**900**	**35200**	**Pass**

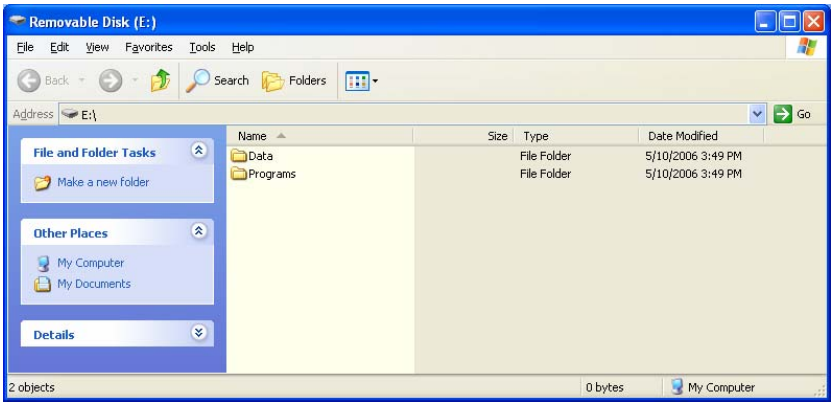
- Use the ISO 14644 tab to compare selected data to the ISO 14644-1 specifications and prescribed bin sizes of 0.1, 0.2, 0.3, 0.5, 1.0, 3.0 and 5.0 microns. User-defined bin sizes cannot be used for ISO 14644 conformance testing
- To use the ISO 14644 display, select the desired ISO classification (Class 2 – Class 9), the desired particle size, the desired data set and samples
- Selected readings for a location will be averaged and each individual sample and average is compared to the ISO specification for the selected class and size. Either the individual samples and averages or just the averages alone can be displayed.

- The last row shows the 95% upper confidence level (UCL) of all the displayed data. The ISO standard requires between two and nine locations; therefore, if fewer than two or more than nine locations are selected, the upper confidence level will not be calculated.

Bulk Data Storage Capability

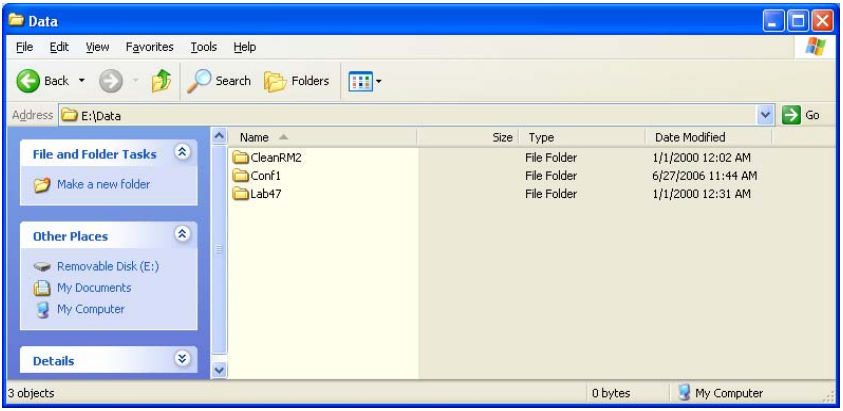
- When connected via the USB cable to a computer, the AEROTRAK appears as an external drive to the computer and data can be removed from the instrument using drag and drop from the Windows Explorer file management program. This feature does not require TRAKPRO to be installed or used and works with Windows XP/2000 computers

Accessing the Data in the File Viewer Window



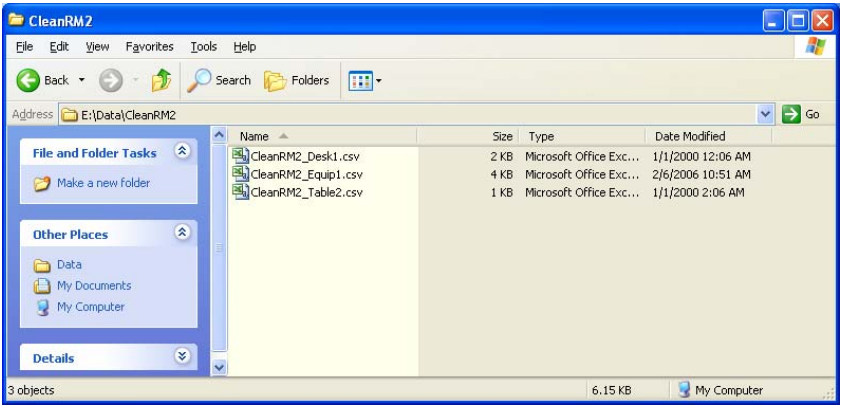
- Two folders will appear in the File Explorer window, the data folder holds all data saved to the instrument and the program folder holds settings or test criteria

Data Folders



- The data folder has subfolders that correspond to the “rooms” that were entered into the instrument

Viewing Folder Contents



- Each room folder has specific sample location files
- Double-click on a folder to view its contents
- The data is stored in CSV format and can be read by Microsoft Excel®

Chapter 5

Maintenance

Note
There are no user-serviceable parts inside this instrument. Opening the instrument case may void the warranty. TSI recommends that you return the AEROTRAK Optical Particle Counter to the factory for any required maintenance or service not described in this manual.

Maintenance Schedule

TSI recommends annual factory cleaning and calibration for the AEROTRAK OPC

Recommended Field Maintenance Schedule

Item	Frequency
Daily zero check	Daily (or before each use)
Clean inlet	Monthly, or as needed
Factory cleaning and calibration	Annually
Wipe down instrument enclosure	As needed or per testing protocol prescribed

Daily Zero Check

- The daily zero check ensures that the instrument is properly assembled and free from leaks, residual particles and electronic noise. Please see Chapter 2, "Set Up" for detailed instructions on performing the zero check.

Cleaning the Instrument Enclosure

- To clean the stainless steel enclosure, dampen a lint-free cloth in alcohol and gently wipe the surface until surface contamination is removed

Chapter 6

Troubleshooting

Symptom	Possible Cause	Corrective Action
Counts are too low	Instrument is being operated outside temperature or relative humidity specifications	Operate instrument within specifications
	Internal parts have been damaged because instrument was stored at a temperature greater than 122 °F (50 °C)	Return to factory for service
	Instrument has contamination on the optics due to condensation or excessive loading	Return to factory for service
	Laser or pump control is damaged	Return to factory for service
	Unit is due for calibration	Return to factory for service
Instrument does not turn on	On/off switch is not being pressed properly	Press and hold on/off switch for one second
	Battery is dead	Recharge battery or connect to AC power
	AC cord is not plugged into unit	Connect AC cord
	The 1A, 250V fuse, located in the fuse holder immediately above the AC power inlet, has blown	Replace fuse

Symptom	Possible Cause	Corrective Action
Instrument does not meet zero count specification (<1 particle/5 mins)	Only one HEPA filter is being used. Both HEPA filters should be used in series	Connect second HEPA filter
	HEPA filters are not connected properly and room air is leaking into the HEPA filter assembly	Check that the HEPA filters have been tightly connected together. Check that both rubber O-rings (black) in the aluminum connector are in place and have not become dislodged
	Residual particles from previous samples are shedding off internal parts and into the optics	Purge instrument by running the instrument for 10–15 minutes before attempting zero count test
	An internal component has been damaged due to operation outside of temperature specifications or one ore more excessive bumps or jolts, and electronic noise is inducing false counts	Return to factory for service
	A leak has developed in the aerosol flow path	Return to factory for service
Battery does not charge	The unit must be turned on for the battery to charge	Turn on unit. Green LED by on/off button will be lit
LOW BATTERY ERROR	Low battery	Recharge battery or connect AC cord
PHOTODETECTOR ERROR	Direct light is entering the aerosol inlet	Remove instrument from direct light
	Laser has become misaligned due to excessive bumps or jolts	Return to factory for service

Symptom	Possible Cause	Corrective Action
SYSTEM ERROR	Information is not being read properly by microprocessor	Restart instrument. If problem persists, contact TSI technical support
TEMPERATURE HUMIDITY PROBE ERROR	Temperature/RH probe was not recognized	Detach and reconnect probe. If problem persists, contact TSI technical support
AIR VELOCITY PROBE ERROR	Air velocity probe was not recognized	Detach and reconnect probe. If problem persists, contact TSI technical support
FLOW ERROR	Instrument was unable to control flow rate (if any tubing is connected to OPC)	Restart measurement
	Pressure drop across inlet may be too large	Lessen pressure drop across inlet by using larger diameter tubing, less tubing, and/or adding a bleed valve
LASER POWER WARNING	Laser power has fallen outside of specification	Return to factory for service
Instrument will not store data file.	OPC storage capacity (128 MB) has been reached	Remove files from OPC memory

Appendix A

Specifications

All specifications meet or exceed JIS B 9921 and are subject to change without notice.

Particle Size Range.....	0.3 to 10.0 µm
Number of Bins.....	6
Default Bin Cutpoints	
Default Thresholds.....	0.3, 0.5, 1.0, 3.0, 5.0, and 10.0 µm
Cutpoint Accuracy.....	50% ±10%
Variable Bin Cutpoints	
Thresholds.....	user defined, between 0.3 and 10.0 @ 0.01 µm increments
Cutpoint Accuracy.....	50% ± 10% for factory settings, 50% ± 20% for any user defined settings
Maximum Concentration..	
8240	400,000 #/ft^3 (5% coincidence loss)
8260	250,000 #/ft^3 (5% coincidence loss)
Counting Efficiency.....	50% ±10% @ 0.3 µm 100% ±10% @ 0.45 µm and greater
Zero Count	<1 count in 5 minutes
Laser.....	660 nm 50 mW laser diode
Pump Flow Rate	
8240.....	1.0 cfm (28.3 lpm) ±5%
8260.....	1.77 cfm (50 lpm) ±5%
Pressure Correction	Performed by internal pressure transducer
Sample Output.....	HEPA filtered for zero emissions
Operating Environment	
Temperature	41 to 95 °F (5 to 35 °C)
Relative Humidity.....	10 to 90 % RH, noncondensing
Storage Environment	
Temperature	32 to 122 °F (0 to 50 °C)
Relative Humidity.....	0 to 90% RH, noncondensing
Display.....	5.7” (14.5 cm) color LCD with touch screen, 320 x 240
Memory.....	128 MB (over 100,000 sample sets)

Communication	USB
Software	TRAKPRO™ Data Analysis Software
Reporting	ISO 14644-1
Computer Requirements..	PC with Microsoft Windows® 2000 or XP; Windows-compatible printer; 5 MB hard disk space; and available USB serial port (for downloading)
Battery Battery type ..... Battery life	 Rechargeable Lithium Ion Battery Pack, 6600 mA-hrs 8 hrs, typical use @ 70°F (21°C); 4 hours continuous
Power	100 to 240 VAC, 50 to 60 Hz
Fuse.....	250V, 1 AMP, TYPE "T", 5 mm x 20 mm
Dimensions (Instrument)...	10 in. x 7 in. x 9.5 in. (25.4 cm x 17.8 cm x 24.1 cm)
Dimensions (Carrying Case)	21 in. x 14 in. x 14 in. (53.3 cm x 35.6 cm x 35.6 cm)
Instrument Weight with battery	12.8 lbs (5.8 kg)
Calibration.....	NIST traceable (included)
Factory Service Interval ...	Annual service recommended
Warranty.....	Three years on workmanship and material

Temperature/RH Probe Specifications

(Optional Accessory)

Temperature	
Range	32 to 95ºF (0 to 35ºC)
Accuracy	±2ºF (±1ºC)
Relative Humidity	
Range	10 to 90% RH
Accuracy	±5% RH

Air Velocity Probe Specifications

(Optional Accessory)

Air Velocity	
Probe Length Collapsed	11.5 in. (29 cm)
Probe Length Extended	43 in. (109 cm)
Range	0 to 4,000 fpm (0-20 m/s)
Accuracy	±5% of reading or 5 fpm (0.025 m/s), whichever is greater

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